CLAIMS

What is claimed is:

1   1.   A method for managing expressions in a database system, the method comprising the

2   computer-implemented steps of:

3   receiving an expression that identifies an event structure, one or more related

4   conditions and one or more related actions, wherein said event structure

5   defines an event that corresponds with said event structure;

6   storing said expression in a table within said database;

7   during a database session,

8   detecting an occurrence of said event by detecting when an event occurs that

9   complies with said event structure, and

10   determining whether said occurrence of said event satisfies any of said

11   conditions; and

12   if said occurrence of said event satisfies any set of one or more conditions, of said

13   conditions, that is associated with one or more corresponding actions, then

14   causing performance of said one or more corresponding actions.

1   2.   The method of Claim 1, wherein receiving an expression comprises receiving an

2   expression that identifies said event structure defined with a set of attributes that

3   describe features of a corresponding event, and wherein said event structure is

4   represented as an object type in said database.

1   3.   The method of Claim 1, wherein receiving an expression comprises receiving an

2   expression that identifies said event structure as a composite event structure having

3   two or more primitive events that are each represented, in said database, as an object

4   type embedded in said composite event structure.

1   4.   The method of Claim 3,

2   wherein detecting comprises detecting an occurrence of a first primitive event of said

3   primitive events by detecting when an event occurs that complies with a first

4   primitive event structure of said composite event structure;

5   wherein determining comprises determining whether said occurrence of said first

6   primitive event satisfies any of said conditions;

7   the method further comprising the computer-implemented steps of

8   persistently storing results of said determining in said database,

9   detecting an occurrence of a second primitive event of said primitive events

10   by detecting when an event occurs that complies with a second

11   primitive event structure of said composite event structure,

12   determining whether said occurrence of said second primitive event satisfies

13   any of said conditions,

14   determining whether any of said conditions are satisfied by both said

15   occurrence of said first primitive event and said occurrence of said

16   second primitive event, and

17   wherein causing performance comprises, if said occurrence of said first primitive

18   event and said occurrence of said second primitive event satisfy any of said

19   set of one or more conditions that have one or more corresponding actions,

20   then performing said one or more corresponding actions.

1   5.   The method of Claim 3, further comprising the computer-implemented steps of:

2   receiving information that specifies a period for which an occurrence of a first

3   primitive event of said two or more primitive events is valid before an

4   occurrence of a second primitive event of said two or more primitive events

5   occurs; and

6   wherein determining comprises determining whether said occurrence of said first

7   primitive event and said occurrence of said second primitive event satisfy any

8   of said conditions in accordance with said information.

1   6.   The method of Claim 3, further comprising the computer-implemented steps of:

2   receiving information that specifies an order in which to evaluate said conditions with

3   respect to said primitive events; and

4   wherein determining comprises determining, in said order according to said

5   information, whether said conditions are satisfied by said primitive events.

1   7.   The method of Claim 1, wherein receiving an expression comprises receiving an

2   expression that identifies an event structure derived from structure of tables, in said

3   database, that store data that represent event occurrences.

1   8.   The method of Claim 7, wherein detecting an occurrence of said event comprises

2   detecting that said data is changed.

1   9.   The method of Claim 1, wherein storing said expression in columns of a table

2   comprises storing one or more conditions as an EXPRESSION data type in an

3   EXPRESSION column of said table.

1   10.   The method of Claim 1, wherein receiving an expression comprises receiving an

2   expression that identifies a condition that is represented as a SQL query on said

3   database.

1   11.   The method of Claim 1, further comprising the computer-implemented step of:

2   receiving a modification, in the form of a SQL operation, to said one or more

3   conditions of said expression.

1   12.   The method of Claim 1, further comprising the computer-implemented step of:

2   during a database session, providing access to a database view that comprises

3   a list of event occurrences that have been determined to satisfy any of said

4   conditions,

5   a list of conditions that have been satisfied by event occurrences in said list of

6   event occurrences, and

7   a list of actions that correspond with conditions in said list of conditions.

1   13.   The method of Claim 12, further comprising the computer-implemented step of:

2   in response to a request from a user of said database system, performing an operation

3   on said view.

1   14.   The method of Claim 13, wherein performing an operation comprises performing an

2   operation to resolve a conflict among two or more conditions that have been satisfied

3   by event occurrences in said list of event occurrences.

1 15.   The method of Claim 13, wherein performing an operation comprises performing an

2   operation that includes scheduling an action for performance outside of said database

3   system.

1 16.   The method of Claim 1, further comprising the computer-implemented steps of:

2   receiving information that specifies that the step of determining is to stop when

3   determining that said occurrence of said event satisfies said set of one or more

4   conditions; and

5   stopping determining whether said occurrence of said event satisfies any of said

6   conditions when determining that said occurrence of said event satisfies said

7   set of one or more conditions.

1 17.   The method of Claim 1,

2   wherein receiving an expression comprises receiving an expression that identifies a

3   temporal condition;

4   wherein said temporal condition specifies that an associated action of the one or more

5   actions is to be performed if a second condition from said set of conditions is

6   satisfied by an occurrence of an event, within a particular time after a first

7   condition from set of conditions is satisfied by an occurrence of an event; and

8   wherein determining comprises determining whether occurrences of events satisfy

9   said first and second conditions in accordance with said temporal condition.

1 18.   The method of Claim 1,

2   wherein receiving an expression comprises receiving an expression that identifies a

3   negation condition;

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4   wherein said negation condition specifies that an associated action of the one or more

5   actions is to be performed if a second condition from said set of conditions is

6   not satisfied by an occurrence of an event within a particular time after a first

7   condition from set of conditions is satisfied by an occurrence of an event; and

8   wherein determining comprises determining whether occurrences of events satisfy

9   said first and second conditions in accordance with said negation condition.

1   19.   The method of Claim 1,

2   wherein receiving an expression comprises receiving an expression that identifies a

3   group of conditions that, when a particular number of conditions from said

4   group of conditions is satisfied by one or more occurrences of events, triggers

5   performance of said one or more corresponding actions;

6   wherein said particular number is less than a number of conditions in said group of

7   conditions; and

8   wherein determining comprises determining whether one or more occurrences of

9   events satisfy said particular number of conditions from said group of

10   conditions.

1   20.   The method of Claim 1,

2   wherein receiving an expression comprises receiving an expression that identifies a

3   group of sequenced conditions;

4   wherein said group of sequenced conditions specifies that an associated action of the

5   one or more actions is to be performed if said conditions from said group of

6   sequenced conditions are satisfied in a particular sequence by one or more

7   occurrences of events; and

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8   wherein determining comprises determining whether one or more occurrences of

9   events satisfy said conditions from said group of sequenced conditions in said

10   particular sequence.

1   21.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 1.

1   22.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 2.

1   23.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 3.

1   24.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 4.

1   25.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 5.

1   26.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 6.

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1   27.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 7.

1   28.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 8.

1   29.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 9.

1   30.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 10.

1   31.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 11.

1   32.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 12.

1   33.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 13.

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1   34.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 14.

1   35.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 15.

1   36.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 16.

1   37.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 17.

1   38.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 18.

1   39.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 19.

1   40.   A computer-readable medium carrying one or more sequences of instructions which,

2   when executed by one or more processors, causes the one or more processors to

3   perform the method recited in Claim 20.

1   41.   A system comprising:

2   means for receiving an expression that identifies an event structure, one or more

3   related conditions and one or more related actions, wherein said event

4   structure defines an event that corresponds with said event structure;

5   means for storing said expression in a table within said database;

6   means for detecting, during a database session, an occurrence of said event by

7   detecting when an event occurs that complies with said event structure, and

8   means for determining, during said database session, whether said occurrence of said

9   event satisfies any of said conditions; and

10   means for causing performance of said one or more corresponding actions if said

11   occurrence of said event satisfies any set of one or more conditions, of said

12   conditions, that is associated with one or more corresponding actions.